AMENDMENTS TO THE CLAIMS

A listing of all claims and their current status in accordance with 37 C.F.R. § 1.121(c) is provided below.

1. (currently amended) An apparatus for spatially homogenizing electromagnetic energy transmitted from different sources ~~for measuring a physiological parameter~~, comprising:

a first inlet ~~for receiving~~ configured to receive electromagnetic energy transmitted from a first source;

a second inlet ~~for receiving~~ configured to receive electromagnetic energy transmitted from a second source;

means for spatially homogenizing the electromagnetic energy transmitted from the first source with the electromagnetic energy transmitted from the second source in a non-random configuration to form a spatially-homogenized multi-source electromagnetic energy; and

an outlet ~~for delivering~~ configured to deliver the spatially-homogenized multi-source electromagnetic energy to a tissue location ~~for measuring the physiological parameter~~.

2. (currently amended) The apparatus of claim 1 wherein [[said]] the means for spatially homogenizing comprises:

a first bundle of optical fibers having a first proximal end originating at [[said]] the first inlet and a first distal end terminating at [[said]] the outlet;

a second bundle of optical fibers having a second proximal end originating at [[said]] the second inlet and a second distal end terminating at [[said]] the outlet;

wherein at [[said]] the outlet each first distal end of each fiber of [[said]] the fibers of [[said]] the first bundle is spatially mixed in an alternating configuration with each second distal end of each fiber of [[said]] the fibers of [[said]] the second bundle, so as to form a spatially-homogenized multi-source electromagnetic energy received from [[said]] the first and [[said]] the second inlets.

3. (currently amended) The apparatus of claim 2 ~~further~~ comprising a cladding surrounding [[said]] the first bundle and [[said]] the second bundle of optical fibers, [[said]] the cladding having a first cladding proximal end at [[said]] the first inlet, a second cladding proximal end at [[said]] the second inlet and a cladding outlet at [[said]] the outlet.

4. (currently amended) The apparatus of claim 1 wherein:

the ~~first source transmits~~ electromagnetic energy from the first source is in a first spectral region[[,]];

the ~~second source transmits~~ electromagnetic energy from the second source is in a second spectral region, wherein the second spectral region is different from the first spectral region; and

the spatially-homogenized multi-source electromagnetic energy is a spatially-homogenized multi-spectral electromagnetic energy.

5. (currently amended) A sensor for measuring a physiological parameter ~~in a blood-perfused tissue location~~, comprising:

a first source of electromagnetic energy ~~configured to direct radiation at said tissue location~~;

a second source of electromagnetic energy ~~configured to direct radiation at said tissue location~~;

an apparatus for spatially homogenizing electromagnetic energy transmitted from [[said]] the first and second sources, [[said]] the apparatus comprising:

a first inlet ~~for receiving~~ configured to receive electromagnetic energy transmitted from [[said]] the first source;

a second inlet ~~for receiving~~ configured to receive electromagnetic energy transmitted from [[said]] the second source;

means for spatially homogenizing [[said]] the electromagnetic energy transmitted from [[said]] the first source with [[said]] the electromagnetic energy transmitted from

[[said]] the second source in a non-random configuration to form a spatially-homogenized multi-source electromagnetic energy; and

an outlet ~~for delivering said~~ configured to deliver the spatially-homogenized multi-source electromagnetic energy to [[said]] the tissue location; and

light detection optics configured to receive [[said]] the spatially-homogenized multi-source electromagnetic energy from [[said]] the tissue location for measuring the physiological parameter.

6. (currently amended) The sensor of claim 5 wherein [[said]] the means for spatially homogenizing comprises:

a first bundle of optical fibers having a first proximal end originating at [[said]] the first inlet and a first distal end terminating at [[said]] the outlet;

a second bundle of optical fibers having a second proximal end originating at [[said]] the second inlet and a second distal end terminating at [[said]] the outlet;

wherein at [[said]] the outlet each first distal end of each fiber of [[said]] the fibers of [[said]] the first bundle is spatially mixed in an alternating configuration with each second distal end of each fiber of [[said]] the fibers of [[said]] the second bundle, so as to form a spatially-homogenized multi-source electromagnetic energy received from [[said]] the first and [[said]] the second inlets.

7. (currently amended) The sensor of claim 6 ~~further~~ comprising a cladding surrounding [[said]] the first bundle and [[said]] the second bundle of optical fibers, [[said]] the cladding having a first cladding proximal end at [[said]] the first inlet, a second cladding proximal end at [[said]] the second inlet and a cladding outlet at [[said]] the outlet.

8. (currently amended) The sensor of claim 5 wherein:

[[said]] the first source transmits electromagnetic energy in a first spectral region[[,]];

[[said]] the second source transmits electromagnetic energy in a second spectral region[[,]]; and

[[said]] the spatially-homogenized multi-source electromagnetic energy is a spatially-homogenized multi-spectral electromagnetic energy.

9. (currently amended) The sensor of claim 8 wherein [[said]] the first source and [[said]] the second source are configured to transmit electromagnetic energy in the range approximately between 500 and 1850 nm.

10. (currently amended) The sensor of claim 8, wherein [[said]] the first source is configured to transmit electromagnetic energy ~~in essentially the red region of~~ at approximately 660 nm.

11. (currently amended) The sensor of claim 8 wherein [[said]] the second source is configured to transmit electromagnetic energy in ~~essentially the infrared region of~~ the range approximately between 890[[-]] and 940 nm.

12. (currently amended) The sensor of claim 5 wherein [[said]] the sensor is an oximeter sensor.

13. (new) A sensor comprising:

a first plurality of optical fibers configured to receive and to transmit electromagnetic energy from a first source, the first plurality of optical fibers having proximal ends and distal ends; and

a second plurality of optical fibers configured to receive and to transmit electromagnetic energy from a second source, the second plurality of optical fibers having proximal ends and distal ends;

wherein the proximal ends of the first plurality of optical fibers are segregated from the proximal ends of the second plurality of optical fibers, and wherein the distal ends of the first plurality of optical fibers are arranged in a spatially mixed non-random configuration with the distal ends of the second plurality of optical fibers such that the transmitted electromagnetic energy from the first source is spatially homogenized with the transmitted electromagnetic energy from the second source.

14. (new) The sensor of claim 13, comprising light detection optics to receive the spatially homogenized transmitted electromagnetic energy from the first and second sources.

15. (new) A system comprising:

a first source of electromagnetic energy;

a second source of electromagnetic energy;

a monitor configured to calculate a physiological parameter; and

a sensor adapted to be operatively coupled to the monitor, the sensor comprising:

a first plurality of optical fibers configured to receive and to transmit electromagnetic energy from the first source, the first plurality of optical fibers having proximal ends and distal ends; and

a second plurality of optical fibers configured to receive and to transmit electromagnetic energy from the second source, the second plurality of optical fibers having proximal ends and distal ends;

wherein the proximal ends of the first plurality of optical fibers are segregated from the proximal ends of the second plurality of optical fibers, and wherein the distal ends of the first plurality of optical fibers are arranged in a spatially mixed non-random configuration with the distal ends of the second plurality of optical fibers such that the transmitted electromagnetic energy from the first source is spatially homogenized with the transmitted electromagnetic energy from the second source.

16. (new) The system of claim 15, wherein the first source and the second source are configured to transmit electromagnetic energy in the range approximately between 500 and 1850 nm.

17. (new) The system of claim 15, wherein the first source is configured to transmit electromagnetic energy at approximately 660 nm.

18. (new) The system of claim 15, wherein the second source is configured to transmit electromagnetic energy in the range approximately between 890 and 940 nm.

19. (new) A method of manufacturing a sensor, the method comprising:

providing a first plurality of optical fibers configured to receive and to transmit electromagnetic energy from a first source, the first plurality of optical fibers having proximal ends and distal ends;

providing a second plurality of optical fibers configured to receive and to transmit electromagnetic energy from a second source, the second plurality of optical fibers having proximal ends and distal ends; and

arranging the distal ends of the first plurality of optical fibers in a spatially mixed non-random configuration with the distal ends of the second plurality of optical fibers.

20. (new) A method of homogenizing multi-source electromagnetic energy, the method comprising:

transmitting electromagnetic energy from a first source through a first plurality of optical fibers configured to receive and to transmit the electromagnetic energy, the first plurality of optical fibers having proximal ends and distal ends;

transmitting electromagnetic energy from a second source through a second plurality of optical fibers configured to receive and to transmit the electromagnetic energy, the second plurality of optical fibers having proximal ends and distal ends; and

outputting spatially homogenized electromagnetic energy of the first and the second source from an outlet region comprising the distal ends of the first and second plurality of optical fibers, wherein the distal ends are arranged in a non-random configuration.